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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Science Talent
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A SCIENCE SERVICE PUBLICATION

MEDICINE

Measles Vaccine Not Near

THERE IS DISCOURAGING news for America's youngsters today.

They will continue to be subjected to the discomforts of one of childhood's most common infectious diseases, measles. This gloomy forecast is based on a statement by a Buffalo virologist that a measles vaccine is not expected to be developed in the near future.

Contrary to recent newspaper articles, scientists are still a long way from such a protective vaccine, Dr. David T. Karzon of the department of bacteriology and immunology at the University of Buffalo School of Medicine, told SCIENCE SERVICE.

Commenting on research with the measles viruses, Dr. Karzon explained that there is some relationship between them and the viruses that cause distemper in dogs. It has been established that children that develop measles develop antibodies against both measles and distemper, he told an audience at Philadelphia's University of Pennsylvania. Scientists believe the viruses are only distantly related, however, because this double action does not occur in all species of animals.

Puppies immunized with measles viruses are capable of challenging very active distemper viruses although the puppies do not exhibit abundant distemper antibodies as a result of the measles infection. This unexpected reaction remains a puzzle, he said.

When asked if a distemper vaccine could produce the reverse effect, that is, stimulate the development of antibodies against measles viruses, the virologist replied that he did not know. For one thing, he explained, distemper may or may not be dangerous in man. As far as is now known, man does not contract distemper, but there is no positive proof that distemper viruses injected into man for the purposes of producing antibodies would not affect humans.

Distemper and measles have similar symptoms which include fever, "runny nose," fatigue and discomfort. As a childhood disease, measles is relatively harmless if it runs its normal course. Possible complications include brain fever or encephalitis, however. In conclusion, Dr. Karzon noted that puppies immunized with infectious measles viruses do not develop clinical symptoms of the disease.

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TECHNOLOGY

Circuits May Be Replaced

ELECTRONIC circuits may be replaced, at least in some Army equipment, by control devices that use liquids or gases, instead of electricity, and that have no moving parts.

Applications of the new control devices, developed by B. M. Horton, R. E. Bowler and R. W. Warren of the Army's Diamond Ordnance Fuze Laboratories, may also include such civilian tasks as controlling dishwashers, power tools and computers. Industrial uses are also foreseen.

The simple units consist of a block of metal or heavy plastic in which passageways have been made. They can perform the same complicated functions of complex electronic circuits in a computer or control device.

Today's weapons of warfare are often controlled by computer-type devices. This gear presents many problems of transportation, maintenance, and repair. In the field, especially under combat conditions, these problems are magnified. Electronic apparatus must be carefully handled and deteriorates rapidly when subjected to extremes of heat and cold, humidity and shock.

The new system is virtually invulnerable to those conditions. Its storage or shelf-life is practically unlimited. Because it has no moving parts to wear out, maintenance and repairs are minimized.

The three civilian scientists have already successfully developed units which can perform amplification, feedback, digital computation, analogue computation, normal mathematical and memory functions.

The new pure fluid amplifiers work by directing a low weak stream of fluid against the side of a strong stream. The weak stream, called the "control stream," displaces or redirects the "power stream" that does the real work.

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AGRICULTURE

Device Measures Cattle's Stomach Gas Pressure

A DEVICE for measuring the pressure of stomach gas in cattle may speed detection and treatment of cattle bloat.

Bloat is an accumulation of gas in the rumen, or first stomach, of cud-chewing animals, which the animal is unable to release, or "burp" out. Its cause and prevention are both unknown and the increased gas pressure involved, if not released in some way, results in the animal's death. Cattle losses due to bloat amount to many millions of dollars annually.

An electronic telemetering system for signalling high rumen pressures is described in Science, 131:611, 1960, by Dr. Loyal C. Payne of the University of Nebraska, Lincoln.

The system involves placing a small FM radio transmitter within the rumen of an animal that is allowed unrestricted movement in a pasture. The transmitter sends out a warning broadcast to a recording receiver wherever a preselected pressure is exceeded.

If one wishes to know whether any of the animals are bloating then all the transmitters are tuned to the same frequency and the receiver is set for this frequency. A pressure switch in each transmitter is adjusted for a given pressure, below which there will be no transmission. But when the pressure is exceeded, transmission begins and the observer knows that one of the animals is bloating.

If one wants to know which specific animal is bloating, each transmitter is tuned to a different frequency. In this manner, ten animals may be telemetered on ten different frequencies. By scanning this range with the receiver, bloat can be determined in individual animals.

The major disadvantage with this system, Dr. Payne reports, is that the transmitter must be recovered by surgery or slaughter. However, he says, the low cost of each unit and the long life of the battery should balance this disadvantage.

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PHOTOGRAPHY

Binocular Viewer, Filters Make Color Pictures

TWO BLACK-AND-WHITE slides of the same subject, when taken through red and green filters and viewed with corresponding filters through binoculars, will yield a full-color picture.

Drs. Norman Geschwind and John R. Segal of the Veterans Administration Hospital's department of neurology in Boston report in the current journal Science, 131: 608, 1960, that a full-color picture also can be seen if one of the filters is not used in the viewing process. This investigation confirms with binoculars the same effect recently studied by Dr. Edwin H. Land of the Polaroid Corporation. Dr. Land, extending British work of 45 years ago, produced a full-color picture on a screen by projecting two black-and-white slides through suitable filters.

The investigators used crossed polarizing screens to adjust the color balance of the picture, and the viewer's brightness control to adjust the color brilliance.

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GENERAL SCIENCE

Science Talent Gathers Friends and Ideas

See Front Cover

SEVEN of the young student-scientists, who by talent and hard work won a place among the 40 winners of the 19th Annual Science Talent Search, are seen on the cover of this week's SCIENCE NEWS LETTER.

Discussing their ideas on science while setting up their exhibits during the Science Talent Institute, held in Washington, D. C., March 3-7, the winners portrayed are from left to right: Dennis Graham Baker, Mass.; Samuel Robert Friedman, D. C.; Joyce Anne Thompson, W. Va.; Arthur Taylor Winfree, Conn.; Gayle Ann Edlund, Ariz.; Richard Pence Mills, Ill.; William Edward Underwood, Mo.

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MEDICINE

Electrode Spots Heartburn

Heartburn may be caused by increased acid in the esophagus shows a tiny electrode—even in cases where X-rays have failed to diagnose the disorder.

A SEVERE, chronic form of heartburn, which sometimes mimics heart disease and ulcers, is being diagnosed by a tiny electrode introduced into the esophagus.

The research is being done by Drs. Steward G. Tuttle and Morton I. Grossman of the Los Angeles Veterans Administration Center and the University of California, Los Angeles, Medical Center.

The electrode is passed via the nasal passage into the esophagus to a point just above where the esophagus joins the stomach. The sensitive electrode detects minute changes in the acid balance in the esophagus. Pressures in the esophagus are recorded simultaneously.

Episodes of heartburn have been correlated directly with increases in esophageal acidity. These begin with a slight increase in acidity and diminish as acidity decreases.

Thus heartburn appears to be associated with regurgitation. No correlation between heartburn and pressure changes in the esophagus was observed.

In additional studies with patients with severe, chronic heartburn, known as esophagitis, tiny amounts of hydrochloric (stomach) acid were dripped into the esophagus.

In such patients heartburn was immediately produced. In patients without esophagitis the acid-drip procedure produced no heartburn. Apparently a sensitivity of the esophagus, perhaps induced by frequent regurgitation, is involved in esophagitis, the investigators said.

The two procedures have proved valuable in diagnosing the disorder in cases in which X-ray studies and clinical observations had not established its presence. Some of these cases had symptoms of angina pectoris and peptic ulcer, which were ruled out with the aid of the new procedures.

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AGRICULTURE

Strontium-90 Builds Up In Lowland Fields

THE GROUND concentration of strontium-90 fallout from nuclear explosions may be ten times higher at the base of slopes, where sediment from water runoff accumulates, than on hilltop areas.

This buildup of strontium-90 in lowland fields was indicated by U. S. Department of Agriculture tests of rainfall and runoff samples at LaCrosse, Wis., and Tifton, Ga.

Soil samples taken from the plow layer of test plots at LaCrosse showed 45 micro-microcuries of strontium-90. Samples from Tifton 16 micro-microcuries per kilogram of soil. A micro-microcurie is one-millionth of a millionth of a curie.

The concentration of strontium-90 in the soil carried by runoff water was about ten times higher—450 and 140 micro-microcuries at these two places, respectively—than the strontium-90 in the soil samples.

Present levels of radioactivity are still below the levels from naturally occurring radioisotopes in soil.

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GEOLOGY

Agadir Earthquake at Tip Of Familiar Seismic Area

THE EARTHQUAKE that razed most of the Moroccan seaport of Agadir March 1 had its epicenter just west of the city. Sizable earth shocks in the past are not listed in the records for that area.

The earthquake was at the tip of the southwestern end of the Alpide earthquake belt, associated with the Alps. The earthquakes of Italy, Greece and Turkey are in this shock-prone area.

The U. S. Coast and Geodetic Survey, Washington, D. C., determined the epicenter of the quake to have been at 9 degrees west longtitude and 30 degrees north latitude, slightly west of the devastated city.

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PSYCHIATRY

"Hopeless" Patients Helped With LSD-25

MENTAL PATIENTS formerly considered hopeless are now able to fight their illness with the aid of the drug LSD-25, two psychiatrists said.

Drs. Arthur L. Chandler and Mortimer A. Hartman of the Psychiatric Institute of Beverly Hills, Calif., reported on the use of the drug, lysergic acid diethylamide, in 110 patients. Their report appears in the March issue of Archives of General Psychiatry.

With LSD-25 as an aid, it has been possible to "reach" and work with patients who are otherwise unresponsive to psychotherapy. Several patients had had as much as six years of previous analytic therapy with no success. After 20 to 40 LSD-25 sessions, they were either discharged as markedly improved or appeared to be well on their way to the resolution of their basic problems, the psychiatrists report.

A total of 88 showed improvement ranging from "slight" to "outstanding" after an average of six sessions with the drug. The group that showed the most progress were the manic-depressives, those who are alternately highly elated and deeply depressed.

An encouraging result, they explained, is the promising progress of those with addictions. Most of these patients were alcoholic problems, but seven of these also had a recent history of drug addiction. The fact that this group did as well as it did suggests the possibility that LSD-25 may be a valuable therapeutic aid in work with this most difficult group, they point out.

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THERMOELECTRIC GENERATOR—The Russian thermoelectric generator converts heat from a kerosene lamp into electricity for radios in remote Asian areas. The generator is examined by J. Donald Rauth (right) and Dr. Mostafa E. Talaat (left), both of The Martin Company, Baltimore, Md., that used similar principles in conjunction with a radioisotope heat source.

MEDICINE

Drugs Could Eliminate TB

THE DRUGS medical science now uses to fight tuberculosis are capable of completely eliminating that disease in this country.

This fact is at the core of a plan to speed up the campaign against tuberculosis announced by Dr. H. McLeod Riggins, president of the National Tuberculosis Association and clinical professor of medicine at Columbia University.

Essentially, the plan is to use available antituberculosis drugs to eliminate all sources of tuberculous infection by adequate treatment of every person with active tuberculosis, and also selected persons with inactive disease.

Dr. Riggins called for an active campaign to locate every person with active tuberculosis and insure his treatment with a drug or combination of drugs known to be effective against this communicable disease. Thus, since the disease is spread from person to person, the chain of infection will be broken and eventually tuberculosis can be eliminated.

The NTA estimates there are at least 250,000 active cases of tuberculosis in the U. S. today. Of these, 100,000 are not known to health departments. An additional 550,000 Americans are believed to carry the disease in an inactive form.

Drugs now used to fight tuberculosis include isoniazid, streptomycin and PAS, p-aminosalicylic acid.

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EDUCATION

Schools Must Stop "Talent Waste"

THE "TREMENDOUS WASTE of talent" in our schools must be eliminated, said Dr. Edwin D. Harrison, president of Georgia Institute of Technology, Atlanta, Ga. Dr. Harrison stated that a considerable number of students who are capable of handling college work do not go to college, and some do not even finish high school. Yet colleges sometimes "welcome with open arms" many students who graduate in the bottom fourth of their high school classes. Within ten years, every major college will have to limit admissions to those students who are competent, Dr. Harrison said.

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DENTISTRY

Mouth Cancer Detectable By Painless Method

MOUTH CANCER, which accounts for five percent of all cancers, can now be detected and diagnosed in its early stages by a simple and painless test.

Dentists of the Veterans Administration Hospital in Brooklyn, N. Y., recently completed a three-year trial in which the test proved to be highly efficient. The technique involves taking a smear or scraping from the mouth for microscopic examination, Dr. Henry C. Sandler, the hospital's chief of dental service, said.

The older test method is biopsy, or removal and laboratory examination of a small slice of tissue. The newer scraping method is just as accurate in testing for cancer, and often reveals the presence of cancer cells when the first biopsy does not.

Dentists can use the smear technique on a wide-scale basis to check on harmless appearing lesions of the mouth and for patients who object to biopsy. However, if cancer is indicated, the doctor may make several biopsies to confirm the diagnosis.

A cooperative study to determine the extent of the technique's usefulness has been begun by dentists at 12 VA stations.

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TECHNOLOGY

Casting Method Found

A SIMPLE, inexpensive method of casting statuary which enables an average foundryman to reproduce an artist's work satisfactorily has been developed at the Massachusetts Institute of Technology.

Casting has restricted American sculptors. Large statues usually have been cast in segments from wax or plaster patterns. Cutting, filing, shaping, burnishing and joining these parts requires time and skill. Only a few foundries in this country, consequently, have been willing to serve artists.

The new method is actually a simplification and improvement of the old "lost wax" process.

To demonstrate what can be done with it, the MIT foundry has produced a 400-pound, two-and-one-half-foot-high, bronze statue of Pegasus. This modern winged horse was the work of a Boston artist, Al Duca, who worked closely with the metallurgists on a project sponsored in part by the Rockefeller Foundation Department of Humanities. Although quite complex, this Pegasus was cast in one piece.

Mr. Duca carved the horse in expanded polystyrene, the fluffy white material used by decorators and florists. This was placed in a large flask and surrounded with sand. Bronze then was poured in at a temperature of 2,300 degrees Fahrenheit. This molten metal vaporized the polystyrene and left a bronze Pegasus beneath the sand in 38 seconds.

"Advantages of this casting technique are several," it was reported in the current issue of The Technology Review, March 8, 1960, published at MIT. "It means that artists can design with more flexibility—a sculpture with complex surfaces will be no more expensive than a simple one. The process is fast and does not present annoying problems of fitting and joining. Aesthetically, too, this method has significance. A sculpture so produced has the organic vitality of initial creation. Its integrity is unquestionable; the model has become the statue."

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ASTRONAUT'S EARTH GUIDE—This instrument will show man in a space capsule where he is in relation to countries, oceans and cities before he fires the rocket to return to earth. The globe will turn with the same movements as the earth in the instrument, made by Minneapolis-Honeywell Regulator Company.

GENERAL SCIENCE

"Age of Decision" Is 13

THE AGE of decision, as far as a future career is concerned, was 13 years of age for a quarter of America's top young scientists. This is shown by a poll of this year's Science Talent Search winners who were in Washington, D. C., for the five-day Science Talent Institute and scholarship judging.

Another quarter of the young scientists said that they never considered for a moment any role in life other than being a scientist. About a tenth of these high school seniors charted their age of decision at nine years old, and a like number delayed until age 15. One girl, now 18, waited until she had had a "fair taste of chemistry" last year to become convinced that science was her field.

The inspiration for this career planning came from such sources as their homes and families, teachers, books and magazines, science projects and science fairs, and visits to research laboratories and museums. They report having been impressed by "the enthusiasm and character" of scientists they know personally. One boy discovered that science was "the most philosophically satisfying method for really finding things out."

The professional goals of these young men and women are fairly awe-inspiring. The 15% planning to enter medical research hope to ferret out the last secrets of such problems as cancer and the chemical processes of life. A matching group is heading into the realms of mathematical theory.

These are followed by the physicists, who want to look into particle and atmospheric physics, and the chemists, physical chemists and biochemists. Others are drawn by the importance of mathematics and science teaching and of finding better and cheaper ways of producing abundant power for individual and industrial use and for space travel.

A great many of the student-scientists hope ultimately to contribute to world peace through their research, and several are driven by what one boy describes as "the fundamental question of why."

As to the adults important to their development in science, 40% of these Science Talent Search winners named teachers; 30% scientists, some of whom are university professors; and 25% members of their families.

Describing the way in which her teacher helped her, one of the girls said: "She taught me to think things out for myself and develop new procedures instead of trying vainly to follow stereotyped ones which were not feasible in our laboratory."

A father is pictured by his son in this way: "He allowed me to use his texts and he has taught me to criticize my work, perfect it, and make certain I am correct."

Two scientists impressed their young proteges in terms of "influence upon my understanding of the job and the place of a scientist in society" and "one of the major influences in causing me to conduct research and not just to study."

The Science Talent Search is conducted by Science Clubs of America, an activity of SCIENCE SERVICE, and is supported by the Westinghouse Educational Foundation.

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CHEMISTRY

New Weight for Silver Will Not Affect Dimes

AN ATOM of silver weighs less than previously thought, but this new finding of the National Bureau of Standards will not affect the silver dimes in your pockets. A dime will still be worth ten cents.

The new atomic weight of silver was set at 107.873 through accurate measurements with a mass spectrometer. The atomic weight currently used is 107.880.

The more precise atomic weight of silver may mean that the atomic weights of other elements may have to be adjusted. Silver has been used to set the atomic weights of certain other elements.

What makes the new measurement significant is the fact that the mass spectrometer was calibrated to extraordinary accuracy through use of known mixtures of the two highly purified silver isotopes.

Silver occurs as two natural isotopes having relative weights of 107 and 109. Ions of the lighter isotope, 107, are deflected more quickly by the magnetic field of the mass spectrometer than those of the heavier isotope, 109. This enabled scientists to separate into groups and collect the 107 and 109 ions. By doing this and measuring the relative abundance of each, the new figure 107.873 was arrived at which represents the atomic weight of silver.

The research was carried out by Dr. V. H. Dibeler, W. R. Shields and Dr. D. N. Craig of the Bureau. It was announced to teen aged winners of the Westinghouse Science Talent Search conducted by SCIENCE SERVICE.

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ENGINEERING

Possibility of Mach 15 In Hypersonic Tunnel

SPEEDS of Mach 15 and higher will be possible in a new low-cost wind tunnel at the Massachusetts Institute of Technology's Naval Supersonic Laboratory.

The tunnel is a result of a new concept in continuous flow hypersonic wind tunnel design. Speeds up to Mach 7.6 and a temperature of 1,000 degrees Fahrenheit have already been achieved. Further development will enable tunnel operators to reach Mach 15 and a temperature of 2,000 degrees Fahrenheit.

The MIT tunnel, developed with funds from the Office of Naval Research, Washington, D. C., places a hypersonic tunnel within an existing but lower-speed supersonic tunnel. (Supersonic speeds are those up to Mach 5, or five times the speed of sound. Hypersonic speeds are those above Mach 5.)

In this tunnel-within-a-tunnel concept, only the central hypersonic core of air is heated. The outer supersonic screen provided by the outer tunnel serves as an insulating blanket at normal temperatures.

These advantages plus a new technique for fabricating the hypersonic nozzle have reduced the cost of the MIT installation to $150,000. This compares to several million dollars normally spent in building hypersonic wind tunnels by using conventional brute force techniques.

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BIOLOGY

Insect-Eating Mammal Has Toxic Salivary Gland

THE STRANGE LOOKING agouta has another claim to fame: It has a potent poison in its salivary glands.

The agouta of Haiti—two feet long, with a long snout, short round ears, hard fur and a long scaly tail—is a very rare insect-eating mammal. Now, a "crude check" on its submaxillary salivary glands shows they contain venom, George B. Rabb of the Chicago Zoological Park reports.

Three of the animals that had died in the zoo were examined, he reports in the Natural History Miscellanea published by the Chicago Academy of Sciences. Parts of the submaxillary and parotid glands were ground and diluted in a salt water solution. This extract was injected into several mice. Those animals given between .38 and .55 milligrams for each gram of body weight died within two to six minutes. Smaller doses were followed by recovery of the injected animals. More than 400 mouse lethal doses could have been prepared from one agouta, he said.

Mr. Rabb reports he was unable to induce the agouta (whose scientific name is *Solenodon paradoxus*) to bite live mice, thus failing to get direct evidence of how the animal gets the poison into its prey. However, a duct of the poison gland is described as ending at the base of the large deeply channeled second incisor tooth of the lower jaw.

There is only one report of a human being bitten by the agouta.

There are some indications that the animal is not immune to its own poison, Mr. Rabb explains. One of the zoo animals had many bite wounds on its feet and no obvious internal evidence of other causes of death.

Since the animal is an insect-eater, the usefulness of the poison gland is unknown, the researcher concludes. Earlier forms may have used them, so the explanation may be phylogenetic and historical rather than one of present-day function. One possible use for the venom is defense or aggression against other agouti during, for example, the breeding season.

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AERONAUTICS

Radio Heaters Threaten Air Navigation Safety

HEATERS that use radio waves to fuse plastic together are seriously interfering with radio navigation aids used by airplane pilots in many parts of the United States.

Improperly shielded radio frequency heating devices, used to make raincoats and other plastic products, pose an especially serious problem in the New York City area, the Federal Communications Commission states in its fiscal 1959 report.

"Clearing the New York City area of their interference is a difficult problem," the report says, "however, progress is being made."

This interference has also hampered police communications. But so far, neither an air crash nor failure of a policeman to make an arrest has been traced to the interference, George S. Turner, chief of the FCC's field engineering and monitoring service reports.

In one instance, a secret broadcast circuit used by the military for national defense was disrupted by interference from heaters for plastics.

"The airways check out their own electronic navigation beacons periodically," said Mr. Turner. "When serious interference near a beacon is noted, both pilots and the FCC are alerted."

Mr. Turner said most of the improperly shielded plastic heaters are used by small manufacturers operating on shoestrings. The number of these operators is increasing rapidly.

Tracking down improperly shielded heaters used by these people is difficult, he said. These manufacturers may occupy one or two rooms on the top floor of a building. They often are forced to move frequently due to non-payment of bills.

Adding to the difficulty of tracing the source of interference is the fact that the heaters do not operate on a single radio frequency.

The frequency of the heater changes rapidly as the plastic begins to melt. This causes interferences to sweep rapidly across a band of radio frequencies used by other people for communications. It makes difficult the job of getting a radio "fix" on the direction from which the interference is coming.

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MATHEMATICS

USSR Pushing to Develop Electronic Calculators

THE USSR is spending lots of men and money to develop better electronic computers, Samuel N. Alexander, chief of the data processing systems division of the National Bureau of Standards, told the Philosophical Society of Washington.

On a recent trip to Russia, he was told that 400 students are enrolled in the University of Moscow's computational mathematics program.

"I think that may be more than, or at least equal to, the total number who take this specialty in all the Western world," he said.

Mr. Alexander said the USSR's present computers or electronic "brains" are less sophisticated than those in the West. "But the USSR seems to get quite acceptable results, so I am beginning to conclude they do it with better-trained men."

He said the USSR's calculations of satellite paths is an example of the country's ability to get good results.

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CHEMISTRY

USSR's Chemical Papers Said to Be Ignored Here

THE USSR RANKS second among all nations in the output of chemical literature, but most of these writings go unnoticed by America's chemical engineers.

Lawrence W. Ross of the Georgia Institute of Technology told the national meeting of the American Institute of Chemical Engineers in Atlanta, Ga., that "Russia produces one-seventh of the world's chemical engineering literature, half as much as America." He said most of it is ignored in the U.S., because of the language barrier.

Mr. Ross said since Stalin's death there has been no "political chemistry" evident in Russian publications but that party-line political meddling had marred earlier scientific literature.

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PHYSICS

Gyro in Satellite Could Test Einstein's Theory

A SPINNING gyroscope in a satellite promises to provide the next new experimental test of the general theory of relativity.

Unsatisfied with the gravitational red shift and the deflection of light as crucial tests of Einstein's general theory, because they can be inferred from special relativity or the equivalence principle, both well proved experimentally, Prof. L. I. Schiff of Stanford's Institute of Theoretical Physics calls for a gyroscope that will operate outside the pull of gravity aboard a satellite instead of in an earth-bound laboratory.

He presents this challenge to other physicists in Physical Review Letters, 4:215, 1960.

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ASTRONOMY

Probe Sleeps Lunar Night

A MOON VEHICLE that will collect information and relay it back to earth during the lunar day, 14 earthdays, and "sleep" during the lunar night, will be remotely-controlled from earth as part of the exploration of the moon planned by the U. S.

This "remote-controlled roving vehicle," that may be available in five years, could explore the moon's surface extensively before man himself sets foot on the moon, Dr. Robert Jastrow of the National Aeronautics and Space Administration told the Geological Society of Washington, D. C.

The robot will pick up actual samples of the moon's surface and analyze lunar conditions as it slowly crawls in any direction its operator on earth directs it.

The roving vehicle may operate indefinitely using solar cells for power.

However, before the project of the roving vehicle can become reality, other unmanned forms of moon exploration must be undertaken. First the lunar surface must be surveyed by moon-orbiting satellites or by crash landings of instrument systems that will send information back to earth from a stationary position.

Suitable landing sites could be spotted by instrumental systems landed on the moon. The images of such sites on the surface could be obtained by television or photography, or both. Dr. Jastrow said that it was likely TV would be used first. He said it is hoped that the images will be at least 100 times better than those we can now obtain by our best telescopes from earth.

One of the most important instruments to be sent to the moon in the earliest exploration will be a gamma ray spectroscope. Mounted in a lunar satellite or a space capsule, it will show the level of radioactivity in the moon's crust which is expected to contain radioactive potassium, thorium and uranium.

"Soft" landings of an impact speed of about 50 miles per hour or less will be attempted later to carry other measuring equipment to the moon before the roving vehicle, and finally man, can land on the moon.

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BIOLOGY

Subtle Differences Found In "Identical" Chemicals

SUBTLE DIFFERENCES are showing up among supposedly identical chemicals in plants, animals and man as the result of new techniques developed by a team of scientists in Waltham, Mass.

The scientists have been studying dehydrogenases, a group of chemical catalysts or enzymes. They were able to analyze these chemicals by separating the dehydrogenase molecule into its components on filter paper, by passing an electric current through it, or by producing antibodies that selectively destroyed the activity of the molecule.

The Brandeis University researchers found that lactic dehydrogenase, the producer of energy in the heart muscle, differed from lactic dehydrogenase of leg muscle.

The heart enzymes of the different mammals were much more similar to each other than the heart and muscle enzyme of one species. In other words, the enzyme in man's heart is closer in properties to the heart enzyme of the rat or cow than to the enzyme in man's muscle, Dr. Nathan O. Kaplan explained. He was assisted in this work by Miss Margaret M. Ciotti, Robert E. Bieber and Dr. Milton Hamolsky, at Beth Israel Hospital, Boston.

So far, 100 species have been studied. In each of the species and strains studied, more or less distinctive kinds and amounts of various dehydrogenases have been found. The scientists have been able to classify the dehydrogenases much as animals have been classified, according to their form.

For instance, the muscle enzyme for man, rat and cow are all quite similar but different from that of the lobster. The lobster enzyme, on the other hand, is very similar to the muscle enzymes of other crustaceans such as crabs and crayfish. The enzymes from the flounder, halibut and sole are all similar. These are all flat fish, and their enzymes are different from other fish such as mackerel and herring.

The scientists are trying to determine what causes this alteration of enzymes during evolution. They hope to establish chemically the evolutionary kinship of the various forms of life. Dr. Kaplan's work is supported by the American Cancer Society, the American Heart Association and the National Cancer Institute.

Science News Letter, March 12, 1960

ENGINEERING

Fire-Fighting Float Stays Put While Working

A NOVEL TYPE of fire-float has been put into service at the big petroleum terminal in Swansea Harbor, South Wales, through which 3,000,000 tons of crude oil are imported annually.

The two-man float has been designed to overcome some of the drawbacks of using sea-going tugs in fire-fighting.

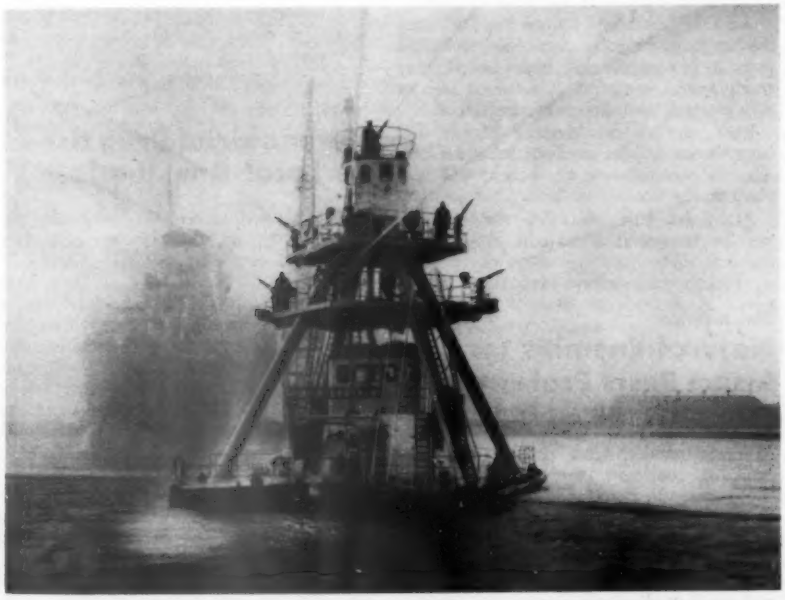
An ordinary tug, no matter how powerful its engine, cannot maintain a steady position relative to the scene of the fire, due to the reaction on the tug exerted by the extinguishing jets of water. These jets push the tug away from the blazing tanker.

The new fire-float, named the "B. P. Firemaster," has been designed so that the engines can counteract the jet reaction and it can move in any direction, even in a strong wind, or keep the craft in a set position.

The "Firemaster" was designed by S. H. Dobson, superintendent-engineer of the B. P. Tanker Company. It is 60 feet long and is surmounted by an open pyramid of four tubular supports, which form a tower having two platforms, a control cabin and a wheelhouse, all linked by two-way loud-hailer radio.

On its three decks are nine fire-fighting nozzles. Seven can be operated in any one direction at once.

Science News Letter, March 12, 1960



FIRE-FLOAT—The "B. P. Firemaster," a fire-fighting float designed at the B. P. Tanker Company, is being tested in Swansea Harbor, South Wales. It is 60 feet long, and seven of its nozzles can simultaneously pour 3,100 gallons of water or 12,500 gallons of foam a minute on a burning tanker.

MEDICINE

Most Headaches Start Elsewhere Than the Head

MOST HEADACHES do not originate in the head.

The cause of a headache usually is not in the head, Dr. Adrian M. Ostfeld of the University of Illinois College of Medicine, Chicago, Ill., reports. About 95% of headaches result from conditions elsewhere in the body, he explains in an article in Today's Health, March 1960, a publication of the American Medical Association.

Such a simple thing as poor ventilation in a room, which results in an imbalance in the air you breathe, may cause a headache. Again, if you run a fever for any reason, the system is in an abnormal state and headache may result. If you skip a meal, your head may ache.

Concentrating on a task too long can result in muscle strain which may lead to fatigue and headache. The headache is probably the result of a release of a "pain substance" from nerve ends in the scalp, at the same time the arteries in the head have become dilated due to one cause or another.

The most common type of headache results from concentration on, or preoccupation with, something for too long a time. It is also the easiest to cure and usually will disappear with a change of position, relaxation and aspirin.

"Oddly enough, acetylsalicylate, aspirin, is an old standby, but we are still not exactly sure what it does do," Dr. Ostfeld reports.

Present medications have their place but they all have short-comings. The ultimate drug will act on the pain substance and thus control the headache safely. This depends upon advances in tissue biochemistry which may take several years.

"One problem is that you cannot give headaches to laboratory animals; this research has to be done in man," he points out.

Unpleasant as they are, headaches serve as an important warning signal of both mental and physical problems. But he stresses that brain tumor, often feared by persons with recurring headaches, turns out to be the cause in only about three out of 1,000 cases.

Science News Letter, March 12, 1960

PUBLIC SAFETY

Air Travel Still Safe, U. S. Statistics Show

FLYING AT HOME or abroad in a scheduled U. S. airliner is about as safe as ever and far safer than driving, statistics being compiled indicate.

The Bureau of Safety of the Civil Aeronautics Board, Washington, D. C., is now compiling and analyzing 1959's crashes, in which 270 persons died from crashes of scheduled U. S. airliners here and abroad. The number of passengers carried is estimated at 52,784,000.

Per passenger mile, 1959 is likely to be a bad year compared to 1958. But compared with an average of the last decade or more, 1959 may be considered a fairly safe year.

Thus 1959 will have a rate of less than one person killed for every 100,000,000 passenger miles flown. For each 100,000,000 passenger miles driven in automobiles and taxis, there are nearly three deaths.

In the first two months of 1960, two fatal crashes of scheduled U. S. airliners have caused 75 deaths—a higher number than the average in two 1959 months. The first 1960 crash on Jan. 6 near Wilmington, N. C., has been traced back to explosives aboard the plane. The other crash was Jan. 18 near Holcroft, Va.

But statisticians say no conclusions can be drawn from figures that cover just two months. Even yearly statistics, they say, are inadequate for good comparisons. Accidents, by their nature, are too random.

Science News Letter, March 12, 1960

ENTOMOLOGY

Test Insect Eradication On Tiny Pacific Islands

U. S. DEPARTMENT of Agriculture entomologists are preparing to test new methods of eradicating fruit flies on tiny Pacific islands.

One of the methods, which has proven very successful against the screwworm in the U. S., is sterile-male release. Large numbers of flies made sterile by radiation will be dropped from planes to mate with native flies. Since the resulting eggs cannot hatch, the population will be greatly reduced. Continued flooding with sterile males could eventually wipe out the flies altogether.

Another method, known as male-annihilation, will involve distributing poisoned lures to attract and kill males before they reach sexual maturity. Continued use of this method also promises eradication.

Rota, one of the Mariana Islands, has been chosen for the sterile-male release test. The male-annihilation experiment will take place on the Bonin Islands.

After the tests, the different methods will be compared as to cost, effectiveness and feasibility.

Science News Letter, March 12, 1960

CONSERVATION

Natural Enemies for Insect Pests Preferred

FARMERS NEED "sophisticated" killing methods for destroying pests, Dr. Stanley A. Cain, chairman of the department of conservation at the University of Michigan, at Ann Arbor, Mich., reported. He said most poisons kill many more creatures than the types of poisons are aimed at. This "blanket" killing through the use of DDT and similar chemicals upsets the balances of nature. "Sophisticated" killing may be accomplished by introducing a natural enemy of the insect or animal to be destroyed.

Science News Letter, March 12, 1960

IN SCIEN

CHEMISTRY

Liquid Helium 3 Gives Theory How Liquids Act

UNUSUAL properties of one of the rarest of all chemical elemental forms, helium of atomic weight 3, are giving scientists new ideas on why and how liquids are liquids.

At extreme temperatures near absolute zero (0 degrees Kelvin) (273 degrees below zero centigrade) helium engages in strange and puzzling antics. Ordinary helium of mass 4, ordinarily a gas at normal temperatures and pressures, becomes a liquid when chilled and remains a liquid even at absolute zero.

Prof. J. G. Daunt, Ohio State University physicist, has been working with the mass 3 helium isotope at low temperatures, now that it has become available through the U. S. Atomic Energy Commission as the result of radioactive disintegration of tritium or triple weight hydrogen.

Unlike its heavier isotopic brother, helium 3 does not seem to exhibit superfluidity, which means the liquid sort of runs up hill. Sound is propagated strangely in ordinary liquid helium in two different ways, but the triple helium shows what theoretically is called zero sound.

Prof. Daunt's experiments, presented in the journal Science, 131:579, 1960, suggest that by advanced magnetic cooling temperatures should be pushed still closer to absolute zero to measure high-frequency sound propagation and attenuation and scattering of light.

Science News Letter, March 12, 1960

PHARMACOLOGY

Antimalarial Drug Used As Local Anesthetic

A DRUG used successfully in treating malaria and chronic arthritis has now been found to be a good local anesthetic as well.

Dr. Edward H. Mandel of New York City reports in the current Archives of Dermatology, 81:260, 1960, that chloroquine dihydrochloride "meets all the requirements of a good local anesthetic."

In speed of action and effectiveness it compares favorably with both novocaine and xylocaine, although it is chemically unrelated to these common anesthetics.

In a group of 31 unselected patients, Dr. Mandel reports, the drug produced in all cases prompt effective local anesthesia that proved adequate for the performance of skin surgery.

No systemic or local toxicity has been observed. A disadvantage, however, is the fact that the drug causes prolonged bleeding at the sites of scalpel surgery. This anticoagulant property was unaltered by the presence of epinephrine.

Science News Letter, March 12, 1960

NCE FIELDS

TECHNOLOGY

Machines Speed Up But Men Do Not

EVEN EXPERIENCED pilots sometimes misread clock styled instruments by as much as 1,000 feet, Dr. Leonard Carmichael, secretary of the Smithsonian Institution, told a safety conference.

But "a shift to direct reading dials with proper sized figures arranged like the familiar automobile mileage indicator when shown in a suitable window caused both reading time and number of errors to drop sharply."

Dr. Carmichael told the President's Conference on Occupational Safety in Washington, D. C., that the airplane dial problem illustrates the need for engineers to think about the operator of devices they design.

"Generations come and go without important changes in human anatomy or physiology but each year faster, stronger and more ingenious Frankensteins are created," he said.

"In 1909, at the first Gordon Bennett air race, the winning plane had an average speed of 47 miles per hour. Today speeds of more than 15 times this rate are not uncommon. But the accurately measured average speeds of the reactions of the human eye and of the human nervous system and of human muscles have not changed by a millisecond since 1909. It then, as now, requires at least one-fifth of a second for a human eye to initiate activities leading to muscle response after novel stimulation."

A jet pilot's reaction time, Dr. Carmichael said, is probably the same as the reaction time of soldiers in the days of Hammurabi in the 21st century B.C.

Science News Letter, March 12, 1960

ARCHAEOLOGY

Volcanic Glass Moisture Helps Date Old Objects

A METHOD has been found to determine the age of objects made from obsidian, or volcanic glass, more than 100,000 years old.

This archaeological dating method was accidentally discovered when two scientists set out to prove that the water contained in volcanic glass is absorbed from the outside and is not originally present in the glass when formed.

The surface of obsidian begins to absorb water as soon as it is formed, and the older the obsidian gets, the thicker the hydrated layer becomes. To determine the amount of time it had taken for the obsidian to absorb a layer of moisture, Drs. Irving Friedman and Robert L. Smith of the U. S. Geological Survey in Washington, D. C., used ancient man-made objects that had already been dated by carbon-14. Once the hydrated layers in objects of known age were measured, it was possible to date other obsidian objects by measuring the thickness of the hydrated layer on their surfaces.

However, much work is still required before exact figures can be obtained. One factor that determines the rate of hydration is temperature. The scientists believe that the hotter a climate is, the faster the obsidian surface will absorb moisture. Other factors to be investigated are relative humidity of any given area, and the chemical composition of the obsidian. The method is also useful for detecting fake artifacts.

Science News Letter, March 12, 1960

MEDICINE

Heart Disease Found With Radioiodine

UNSUSPECTED heart disease or suspicious heart disease symptoms may be detected by a relatively simple radioactive technique for measuring the flow of blood in the arteries of the heart muscle.

The technique was developed at the University of California, Los Angeles, Medical Center, by Drs. Ismael Mena, Leslie R. Bennett, Mark Winfield and Albert A. Kattus.

A very small amount of radioiodine compound is injected into a vein. Two scintillation counters, one placed over the heart, the other over the brain, follow progress of the compound as it goes to the heart and thence into the arterial system feeding the brain.

The difference in the rate at which the radioactive compound clears the heart and the brain is due to the flow of the compound into the heart blood vessels. In coronary heart disease some blood vessels of the heart are blocked.

Thus the flow of the radioactive material into the heart blood vessels is impeded and the more severe the heart disease the less radioactive material that can flow into the heart arteries. In fact the rate of clearance of radioactivity from the heart and brain in heart disease patients is almost identical.

In studies with the new procedure the investigators have been able to detect heart disease in subjects with normal appearing electrocardiograms. In other cases it has helped to confirm other findings symptomatic of heart disease.

Science News Letter, March 12, 1960

PUBLIC HEALTH

Lab in Austria Will Test Water, Soil, Food

THE INTERNATIONAL Atomic Energy Agency is building a laboratory near Vienna, Austria, where radioactive analyses will be made of samples of air, water, soil and food from member nations that request the tests. The testing forms part of the agency's work in promoting health, safety and proper disposal of radioactive wastes connected with the peaceful uses of atomic energy.

Science News Letter, March 12, 1960

AGRICULTURE

Soaked Peas Yield More Abnormal Seedling

PEAS PLANTED directly in moist soil produce a higher percentage of healthy plants than peas soaked in stagnant water for 48 hours before planting.

Experiments by Alex. M. M. Berrie of the University of Glasgow, Scotland, and described in Nature, 185:622, 1960, indicate that the normal course of development in the pea can be altered by exposing the seed during germination to conditions that affect oxygen respiration.

The botanist planted four sets of peas of about 200 each. One set had been soaked in running water, another in stagnant water. A third batch had been exposed to an atmosphere of 20% carbon monoxide. The fourth set was planted directly in moist soil.

He found that those subjected to running water produced 175 seedlings, five of which were abnormal. Those exposed to carbon monoxide yielded 171 seedlings, nine of which were abnormal. The peas that had been soaked in stagnant water produced 129 seedlings, including 34 abnormal ones, and the directly planted peas produced 161 seedlings, seven of which were abnormal.

The peas soaked in stagnant water, therefore, yielded fewer seedlings and a higher percentage of abnormality.

Abnormal seedlings may be due to one or more of the following reasons, the researcher reports:

1. A disturbance of the normal metabolism during the first 48 hours of germination.

2. The removal by leaching of an essential water-soluble metabolite.

3. The accumulation within the seed of of a material that adversely affects growth.

Science News Letter, March 12, 1960

PUBLIC HEALTH

Man Must Learn to Live With More Poison

AS LIFE and industry get more complex, man must deal with more and more poison, Dr. John A. Zapp Jr., of the Du Pont Company's Haskell Laboratory for Toxicology and Industrial Medicine in Wilmington, Del., said.

Man cannot get rid of poisons without giving up automobiles and other benefits of industry, Dr. Zapp told the President's Conference on Occupational Safety in Washington, D. C. He said that careful tests with animals will indicate what levels of poisons can be tolerated without harm.

The body can cope quite well with small doses of poison, he said. Almost all food and water contain small amounts of lead and arsenic. Burnt toast and charred meat contain traces of well-known carcinogens (elements that induce cancer).

Toleration points are the all-important factor, Dr. Zapp said, and illustrated: two tablets of aspirin can cure a headache, 150 can kill.

Science News Letter, March 12, 1960

ANTHROPOLOGY

Digging Up the First True Man

Very scant fossil evidence substantiated Darwin's theory of man's evolution at the time it was first proposed, but finds of the last 100 years increasingly support it.

By TOVE NEVILLE

A SINGLE TOOTH, a piece of skull or hipbone may be the only clues to the identity of the first true man. That the anthropologist can derive so much information from fossil remains is a great achievement due to his use of scientific know-how and imagination.

In trying to judge who is the first true man, what are the qualifications necessary to call a creature who walks erectly on two feet a man?

Some experts feel that a large brain, as indicated by the capacity of the skull, is the distinguishing mark. However, it is possible to have a large brain with a limited intelligence.

The complexity of the brain counts as much as the actual size. Some anthropologists, among them Sir Wilfred E. Le Gros Clark, use another criterion: enough intelligence to be able to make tools.

An example of a primitive man is Zinjanthropus boisei, found in 1959 in Tanganyika, East Africa, and believed by his discoverer to be perhaps the first true man. He has a very primitive human type skull, and nine tools were reported found with him.

Although his cranial capacity would not have allowed for a brain of more than about 600 cubic centimeters, comparable with the large modern apes, his brain size was probably much larger in proportion to his body size.

His human type teeth are also important, especially in the light of the development of tools. Darwin himself stressed the possibility that the big tusk-like teeth, as found in the large apes, were modified and reduced as man became able to defeat his enemies with his hands, tools and weapons. At an early stage of man's evolution, the mouth is believed to have been used widely as a weapon.

As the human-like creature in time began to pick up rocks and sticks to use as tools and weapons, the canine teeth became less necessary for wounding an enemy.

Later in his development, man was able to make tools and weapons to suit his needs, and still later to make specific forms of tools for special purposes. Makeshift tools, such as rocks and sticks, do not distinguish true man. Tools in the strictest sense of the word must be shaped and made deliberately for a specific purpose, and in any society they are generally made according to certain patterns, or conventions.

Whether or not Zinjanthropus will be considered the first true man on the basis of his tools and human characteristics is yet to be decided by the world of experts. Geological evidence indicates that he is over 600,000 years old and lived at the time the first ice age was at its height in the Northern Hemisphere. This makes him 100,000 years older than the earliest Pithecanthropus, or Java Man, who is over 500,000 years old.

The first find of Pithecanthropus, whose name means ape-man, was made in Java just after the turn of the century. His cranial capacity was estimated at about 900 cubic centimeters, and the skull had the prominent eyebrow ridges associated with apes. However, the thighbone also found was indistinguishable from that of modern man.

Later finds of Pithecanthropus were made in China, near Peking, and skulls were found of up to 1,300 cubic centimeters, or well within the cranial capacity of skulls of modern man though not very likely with the same brain power, because the shapes of the skulls suggest that the brain had a simpler organization.

The first Peking Man was known by the find of merely one single molar tooth of human type in 1927, and he was at first called Sinanthropus, or Man of China, and thought to be different from Java Man. As more remains were found in China and Java, it became apparent that these early humans were of a similar type. Pithecanthropus has been called a true man because of his many human characteristics and apparently true tools.

Table of Important Facts About Some Early Types, From the Most Primitive Man-Like Creature to a Truly Modern-Type Man

Ages and time scales of ancient man and geological eras are subject to change as new information comes to light with the progress of dating methods. Therefore, dates can only be approximate and will be found to differ with different authors almost from year to year. The following dates are the best possible estimates available today, according to consulted authorities.

NAME	DATE OF DISCOVERY	PLACE OF DISCOVERY	THIS TYPE LIVED	DESCRIBER	PARTS FOUND
Oreopithecus	1869	Tuscany, Italy	Over 10,000,000 years ago	Paul Gervais	Lower jawbone
Australopithecus	1925	Taung, S. Africa	Between 1,000,000 and 500,000 years ago	Raymond A. Dart	Skull
Zinjanthropus	1959	Tanganyika, E. Africa	Over 600,000 years ago	L. S. B. Leakey	Skull and shinbone
Pithecanthropus	1891	Solo River, Java	Over 500,000 years ago	Eugene Dubois	Skull and thighbone
Heidelberg Man	1907	Heidelberg, Germany	About 500,000 years ago	Otto Shoetensack	Lower jawbone
Swanscombe Man	1935-36	Swanscombe, England	Between 500,000 and 250,000 years ago	Sir W. E. Le Gros Clark and G. M. Morant	Skull fragments (2)
Fontechevade Man	1947	Fontechevade, France	Between 250,000 and 120,000 years ago	H. V. Vallois	Skull fragments (2)
Neanderthal Man	1856	Neanderthal Valley, Germany	From about 120,000 to 50,000 years ago	D. Schaaffhausen	Skull and part of skeleton
Mt. Carmel Man	1931-32	Mt. Carmel, Palestine	Less than 100,000 years ago	T. D. McCown and Sir Arthur Keith	Parts of 12 or more skeletons, including skulls
Cro-Magnon Man	1868	Cro-Magnon, France	From about 50,000 to 20,000 years ago	Paul Broca	Parts of four skeletons, including skulls

Heidelberg Man, found in Germany in 1907, lived about half a million years ago and might rank as one of the earliest true men if enough evidence were available. However, only his lower jawbone was found, and there were no tools with his remains.

Swanscombe Man, found in England in 1935 and 1936, lived somewhere between 500,000 and 250,000 years ago. From the well preserved pieces of his skull it is possible to estimate that he had a brain capacity of 1,300 cubic centimeters which is comparable to Homo sapiens, or modern man, with an average of 1,350.

Flint tools were also found at the site as well as animal remains, and there is no reason to doubt that Swanscombe Man was a true man. If, because of his modern type skull, Swanscombe Man is accepted as a true modern man, then Homo sapiens is much older as a species than thought earlier.

Fossil skulls, also thought by some to be of early Homo sapiens from between 250,000 and 120,000 years ago, have been found at Fontechevade in France.

An uncle or cousin to modern man is Neanderthal Man, first found near Neanderthal Valley in Germany and later in various places in Europe, Africa and Western Asia. He was a low-browed individual with huge eyebrow ridges and a cranial capacity of about 1,450 cubic centimeters.

Neanderthal Man was a true man, credited with a culture, including tools and weapons, and is even by some authorities thought to have invented the art of sewing. He lived from about 120,000 years ago until near the end of the last glacial period when he became extinct, most likely wiped out by other men with smaller but more intelligent brains.

An interesting find of a Neanderthal Man with a crushed skull was made in Shanidar cave in northern Iraq in 1957. He had one defective arm thought to be a birth injury, yet, apparently his fellows permitted him to live and must have helped to provide food for him. Part of the defective arm had later been amputated and furnishes what may be the first example of surgery on record.

Neanderthal Man is not now generally considered as a step in the evolutionary development of later man but rather a sideline not in the direct line of descent of modern man. He lived at a time when modern man was already in existence.

At Mount Carmel in Palestine remains of men were found who lived early in the last glacial period, probably less than 100,000 years ago. The Mount Carmel skulls are of two types. One has very pronounced eyebrow ridges like Neanderthal Man, but the other is more like Homo sapiens, or modern man.

(Continued on p. 173)

APE-MAN CALLED TRUE MAN—Pithecanthropus, whose name means ape-man, lived more than 500,000 years ago in Java and China. He has been called a true man because he knew the uses of fire and apparently shaped his own tools. The restored portions of the skull appear lighter than the original skull, a cast of which is in the Smithsonian Institution, Washington, D. C.

Books of the Week

For the editorial information of our readers, books received for review are listed. For convenience purchase of any U. S. Book in print, priced at 95¢ or over, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

THE AERODYNAMICS OF POWERED FLIGHT—Robert L. Carroll—*Wiley*, 275 p., $8.50. Logical and modern introductory course in aerodynamics.

AMERICAN BUILDING ART: The Nineteenth Century—Carl W. Condit—*Oxford Univ. Press*, 371 p., illus., $12.50. History of structural forms and techniques used in such utilitarian construction as bridges, dams and railroad stations.

AMERICAN DRUG INDEX 1960—Charles O. Wilson and Tony Everett Jones—*Lippincott*, 3rd ed., 712 p., $5.75. Alphabetical with extensive cross-indexing, lists generic and chemical names, manufacturer, pharmaceutical forms, size, dosage and use.

A BIBLIOGRAPHY OF INTERNAL MEDICINE: Selected Diseases—Arthur L. Bloomfield—*Univ. of Chicago Press*, 312 p., $6. Excerpts from fundamental, current and older works on 21 diseases.

A BOOK ABOUT BEES—Edwin Way Teale—*Ind. Univ. Press*, 208 p., photographs by author, paper, $1.95. Reprint of 1940 edition.

A BOOK TO BEGIN ON NUMBERS—Leslie Waller—*Holt*, 48 p., illus. by Shannon Stirnweis, $2.50. Amusingly illustrated, this book introduces young readers to number concepts.

CHEMISTRY FOR SANITARY ENGINEERS—Clair N. Sawyer—*McGraw*, 367 p., illus., $9.50. Discusses fundamentals of chemistry on which sanitary engineering practice is based.

CLASS D CITIZENS RADIO—Leo G. Sands—*Ziff-Davis*, 181 p., illus., $4.95. Information about equipment, installation and operation of two-way radio communication systems.

CONTRIBUTIONS TO THE PHYSICAL ANTHROPOLOGY OF THE SOVIET UNION—V. V. Bunak, G. F. Debets, M. G. Levin and others, transl. from Russian by Vladimir M. Maurin—*Peabody Mus.*, 192 p., maps, paper, $4.50. Recent Soviet anthropometric data, especially from the Caucasus.

THE CULTURE OF THE STATE MENTAL HOSPITAL—H. Warren Dunham and S. Kirson Weinberg—*Wayne State Univ. Press*, 308 p., $5. Study of mental patients exposed to resocialization techniques employed by Lafayette Clinic.

THE DIPLOMACY OF DISARMAMENT—Joseph Nogee—*Carnegie Endowment for Int'l Peace (Taplinger)*, 72 p., paper, 35¢. Analysis of the changing framework and scope of disarmament negotiations since 1945.

DONNER PASS AND THOSE WHO CROSSED IT—George R. Stewart—*Calif. Hist. Soc. (Lane Pub. Co)*, 96 p., illus., paper, $1.95. Documented story of the mountain pass noted for its difficult passage by early wagons and railroad builders.

ELEMENTS OF ION EXCHANGE—Robert Kunin—*Reinhold*, 164 p., illus., $5.75. Basic treatment of ion exchange techniques.

EXPLODING WIRES—William G. Chace and Howard K. Moore, Eds.—*Plenum Press*, 373 p., illus., $9.50. Based on 1959 Conference on the Exploding Wire Phenomenon. Of interest to workers in the fields of high speed photography, shock wave, and thermonuclear research.

GENERAL DRAFTING—Verne C. Fryklund and Frank Roy Kepler—*McKnight*, 3rd ed., 204 p., illus., $3.40; paper, $2. Instruction with problems.

GENETICS NOTES—James F. Crow—*Burgess*, 4th ed., 149 p., illus., paper, $3.60. Summary of principles taught in general genetics course.

HEALTH FACTORS IN SAFE HANDLING OF CHEMICALS—*Manufacturing Chemists Assn.*, 4 p., 15¢, direct to publisher, 1825 Conn. Ave., Washington 9, D. C. Recommended safe practices.

THE HERRING FISHERY OF THE NORTHWEST ATLANTIC—Leslie W. Scattergood and S. N. Tibbo—*Fisheries Res. Bd. of Canada (Queen's Printer)*, Bull. 121, 42 p., illus., paper, 75¢. Account of history, fishing gear, quantities caught and their utilization.

A HISTORY OF POLAR EXPLORATION—L. P. Kirwan—*Norton*, 374 p., illus., $5.95. Complete history of polar expeditions, both Arctic and Antarctic, by Director of the Royal Geographic Society.

INTRODUCTION TO FOODS AND NUTRITION—Gladys T. Stevenson and Cora Miller—*Wiley*, 517 p., illus., $6.25. One-semester course.

INTRODUCTION TO GEOPHYSICAL PROSPECTING—Milton B. Dobrin—*McGraw*, 2nd ed., 446 p., illus., $9.50. Covers technical advances since 1950, such as seismic, gravity, magnetic, electrical and radioactivity prospecting.

LANDSLIDE AND FOUNDATION INVESTIGATIONS AND STABILITY ANALYSIS—D. P. Krynine and others—*Highway Res. Bd.*, Bull. 236, 68 p., illus., paper, $1.20. On the methodology of landslide investigations in Soviet Russia, and other studies.

MIDDLE AGE: Threat or Promise?—Harry Milt—*Public Affairs Committee*, Pamphlet No. 294, 20 p., illus., paper, 25¢ On emotional adjustment in middle age.

PSYCHIATRIC DICTIONARY—Leland F. Hinsie and Robert Jean Campbell—*Oxford Univ. Press*, 3rd. ed., 788 p., $17.50. Includes 1,629 new entries, also terms from allied fields, such as clinical neurology, genetics and eugenics, forensic psychiatry and nursing.

SCHOOLS AND INDUSTRY: Partners in Science Education—*Thomas Alva Edison Foundation*, 30 p., paper, single copies free upon request direct to publisher, 8 W. 40th Street, New York 18, N. Y. Summary of 1959 School-Industry Science Conference.

SPECIAL SOURCES OF INFORMATION ON ISOTOPES—*Office of Isotopes Development, U. S. Atomic Energy Commission*, rev. ed., 54 p., paper, free upon request direct to publisher, Washington 25, D. C. Lists more than 300 references.

A STUDY OF MURDER—Stuart Palmer—*Crowell*, 239 p., $4.95. Analytical study of 51 men convicted of murder, based on interviews with the murderers, their relatives and friends.

A STUDY OF SCIENTIFIC AND TECHNICAL MANPOWER: A Program of Collection, Tabulation and Analysis of Data—National Science Foundation—*House Committee on Science and Astronautics*, 71 p., paper, single copies free upon request direct to Committee, U. S. Congress, Washington 25, D. C.

THE THEORY OF SPACE TIME AND GRAVITATION—V. Fock, transl. from Russian by N. Kemmer—*Pergamon*, 411 p., $15. Covers both special relativity and what is usually called general relativity. Textbook on post-graduate level.

THE THUNDER OF THE GUNS: A Century of Battleships—Captain Donald Macintyre—*Norton*, 352 p., illus., $3.95. Account of the origin, design and battles fought by the big warships.

TRAFFIC BEHAVIOR ON FREEWAYS—Charles J. Keese and others—*Highway Res. Bd.*, Bull. 235, 132 p., illus., paper, $2.40. Studies of freeway medians, urban expressways, ramp design and freeway traffic operation.

WILL MY HEART FAIL?—William A. Jeffers—*Lippincott*, 157 p., illus., paper, $1.25. Doctor discusses mechanics of circulation, and disorders of the heart and blood vessels that cause these organs to fail in efficiency.

THE WORLD OF PRIMITIVE MAN—Paul Radin—*Grove*, 370 p., paper, $2.25. Reprint of 1953 edition.

Questions

ASTRONOMY—What is the desired speed aimed at by NASA scientists for "soft" landings on the moon? p. 167.

MEDICINE—From what does the most common type of headache result? p. 168.

TECHNOLOGY—What are the main advantages of the new casting method? p. 165.

***Photographs:* Cover, Science Service; p. 163, Martin Company; p. 165, Minneapolis-Honeywell Regulator Company; p. 167, F. C. Livingstone; p. 171, Smithsonian Institution; p. 176, Eastman Chemical Products, Inc.**

The First True Man

(Continued from p. 171)

More recent types of Homo sapiens were found at Cro-Magnon in France. They were tall, muscular, high-browed people with refined faces and great cranial capacity. A variant of the Cro-Magnon type has been found at Combe Capelle, also in France, but this man has more protruding eyebrow ridges.

The Cro-Magnons flourished between 50,000 and 20,000 years ago when the ice sheets from the last glacial period were retreating back toward the North Pole. They developed a culture of a very high degree of artistry and craftsmanship. Another late modern man with some Eskimoid features of the skull was found at Chancelade, France. Possibly related to the Cro-Magnon, he lived up to about 10,000 years ago and is believed by some to be the ancestor of the Eskimos.

The cradle of humanity was thought by Darwin to be Africa, and this may well turn out to be so. However, nature seems to have experimented in this regard, for an ape-man, estimated to be over 10,000,000 years old was found in northern Italy.

Called Oreopithecus, or "the mountain ape," the fragments of some 50 individuals of this ape-man were found in soft coal beds. Some of the human-like characteristics found were the shape and pattern of wear of his teeth and the shape of the dental arch.

Oreopithecus probably is not a direct ancestor of man but may be a relative who represents an extinct branch of the family Hominidae to which man belongs. Thus he and modern man would have evolved from the same ancestor who, Darwin believed, lived about 40,000,000 years ago.

More likely the ancestors or very close relatives of modern man would be the Australopithecines of South Africa. Living between 1,000,000 and 500,000 years ago, this group of primitive creatures combines ape-like and primitive human characteristics, and although the name Australopithecus means southern ape, the Australopithecines seem to have been more human than ape. The Australopithecines had a cranial capacity of only 450 to 700 cubic centimeters.

Piltdown Man, reported found in Sussex, England, between 1908 and 1915, was later exposed as a fake. It turned out to be a composite of a skull from an early Homo sapiens with the jaw of a modern ape which had been treated with chemicals to make it look like a fossil. The hoax was exposed by microchemical tests, X-ray spectrography, and crystallographic analysis.

Science News Letter, March 12, 1960

Do You Know

Bilharziasis, sometimes called snail fever, is caused by the parasite of mollusks often found in water.

Africa, with an area of 8,000,000 square miles, has 155,000,000 people in 37 countries and territories or federations of territories including Madagascar but not such islands as Mauritius, St. Helena and Reunion.

STATISTICS

Hospitalization Goes to Nearly Twice 1950 Level

THE NUMBER of Americans who subscribe to hospital insurance has almost doubled in the past ten years.

Health Insurance Institute figures show that at the beginning of 1950, some 66,000,000 persons were covered by this insurance. The number grew to 123,000,000 by the close of 1958. A preliminary sampling indicates that the 1959 year-end coverage figures will exceed 125,000,000.

Progress during the 50's also marked the other major types of health insurance: surgical expense insurance, regular medical insurance, loss of income, and major medical expense insurance.

From the beginning of 1950 to the end of 1958, the number of persons with surgical insurance rose from 41,000,000 to 111,000,000, while the climb was from 17,000,000 to 75,000,000 in regular medical insurance, which pays for doctor visits for non-surgical care.

In little more than ten years, the number of subscribers to major medical insurance rose to 17,000,000. This insurance provides benefits from $5,000 to $15,000 to help absorb the cost of serious illness.

Senior citizens are getting a break in the form of various methods by which insurance companies can provide protection for those more than 65 years old.

Science News Letter, March 12, 1960

Stabilized two-stage flame, no additives

One of a series

The burning question of cool flames

Between the brief stage of not burning and burning, many hydrocarbons react with oxygen at temperatures well below that of normal flame combustion. But the reactions are usually transient and hard to analyze. At the General Motors Research Laboratories, we have been able to investigate the *effect of chemical additives on cool preflames.*

To do this, the almost invisible cool flames are stabilized for hours in a flat-flame burner, permitting careful examination of the retardation or acceleration effects of the additives. From more than twenty additives studied, experimental results indicate that some chemicals affect combustion through the mechanism of preflame reactions. We are now accumulating new information on these additives' mode of operation. For instance: emission spectra support the conclusion that tetraethyl lead reacts with the oxygenated compounds formed in cool flames to yield lead oxide vapor. These findings of when and how lead oxide is formed are important in resolving a current controversy of science — the combustion behavior of tetraethyl lead.

Studies such as this may lead to more economical and effective means of controlling unrestrained combustion — such as "knock" in reciprocating engines. The work is typical of GM Research's effort to provide useful information for a moving America. And in this way continue to keep our promise of "More and better things for more people."

General Motors Research Laboratories

Warren, Michigan

Iron carbonyl, an antiknock

Ethyl nitrate, a proknock

Iron carbonyl retards, ethyl nitrate accelerates central portion of cool flames.

New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 1030. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

DOG'S DOOR BELL lets you know when your dog wants in or out. The mechanical device is mounted on or near the door with two screws and requires no wiring or batteries. It is said that when the dog is trained to use the bell, he will stop scratching your door.

Science News Letter, March 12, 1960

DRAIN PIPE HOSE of vinyl plastic attaches to the downspout from a house rain gutter to carry rain water four feet away and sprinkle it on the lawn. The hose prevents gullies in the lawn caused by water running directly from the spout. When the rain stops, the hose is designed to coil itself up next to the spout.

Science News Letter, March 12, 1960

ROD-LESS REEL of red, green or blue anodized aluminum is a complete fishing outfit that can be carried in a pocket. Useful for casting, trolling and still fishing, the deluxe model has 140 feet of 14-pound-test nylon line and five spoon plugs.

Science News Letter, March 12, 1960

PLASTIC CROQUET SET, shown in the photograph, resists splintering or cracking under hard, competitive blows of vigorous players. Showers and dew will not harm the polyethylene plastic. The set can

be washed without harm to the colors and lustrous finish.

Science News Letter, March 12, 1960

KEY PROTECTOR holds house keys or valuable business keys. Hooked over the handle to a filing cabinet or garage door, the protector cannot be removed nor the keys taken from it unless one knows the combination to the protector's lock.

Science News Letter, March 12, 1960

WALL COVERING of vinyl and cork is colorful, washable and especially suited for dens, family rooms or children's rooms. It takes picture hooks, nails and thumbtacks like a bulletin board. Remove the tack and the vinyl surface is drawn together by the cork backing and the hole is gone.

Science News Letter, March 12, 1960

COLORED RECORDING TAPE is designed to help studios distinguish between various categories of recorded materials or between recordings made at different levels or equalizations. There are three colors, blue and green and the conventional oxide brown.

Science News Letter, March 12, 1960

TRANSISTORIZED GEIGER COUNTER slips into worker's shirt pocket. The five-ounce battery-powered counter clicks audibly 20 times a minute for background radiation, more urgently as radiation hitting the wearer increases, until finally reaching a high-pitched whine.

Science News Letter, March 12, 1960

Nature Ramblings

By HORACE LOFTIN

False Spring

UNTIL well into January, winter was more like Indian summer in the lower South. Topcoats stayed in the closet and oil heaters were used just enough to take the chill from the air. On particularly warm days, frogs sang in the marsh and bats could be seen darting after insects. In the second week of January, the buds of a mulberry tree began to swell, threatening to open with each day's sunshine.

Many of the typical winter birds of the region, especially the hardier insect eaters, had been strangely scarce through the winter months. Where were they? Possibly farther to the north than was their usual custom, due to the mild weather.

From the sights and sounds of nature and the warmth of the air, spring seemed just around the corner, though the calendar denied the fact.

Overnight this picture changed. First came heavy rains, followed by a great cold

front which swept down from the north. Morning broke bright and clear, but a thick frost colored the lawns and fields. The mulberry buds died and browned, deceived by the false spring. No bats flew or insects chirped in the near-freezing air that day! But on the sides of the road and in the brown fields, flocks of winter birds were suddenly seen in large numbers, as if driven south by the icy front.

The bats, the frogs, the mulberry, the northern-lingering birds all were fooled, so to speak, by this springtime weather in winter. But many or most of the plants and animals that must hide or run before the temperatures of winter were not tricked. While the mulberry tree responded to the unseasonably warm weather, the great pecans that line city streets refused to rouse from dormancy. Similarly, many of the birds ignored the warmth and kept to their usual winter quarters, while other insects, amphibians and reptiles continued in their winter sleep.

Actually, the majority of the plants and animals which are greatly affected by winter do not "become aware" of spring's arrival by changes in temperature. Rather, it is the gradual lengthening of the days—the increasing amount of sunlight—that tells them when spring is imminent. The swallow and the pecan are not to be tricked like the mulberry and the bat by a false spring which might lure them to disaster.

Science News Letter, March 12, 1960